

Claims

1. An aqueous disinfecting or sanitizing solution having a pH of from 1 to 7 and consisting essentially of:
 - i) hydrogen peroxide in a concentration of from 0.01 to 20 wt./wt.% of the solution;
 - ii) at least one phosphorus-based acid in a concentration range of from 0.05 to 8.0 wt./wt.% of the solution;
 - iii) at least one anionic surfactant selected from the group consisting of C8 to C16 alkyl aryl sulfonic acids and alkali metal and ammonium salts thereof, sulfonated C12 to C22 carboxylic acids and alkali metal and ammonium salts thereof, C8 to C22 alkyl diphenyl oxide sulfonic acids and alkali metal and ammonium salts thereof, naphthalene sulfonic acids and alkali metal and ammonium salts thereof, C8 to C22 alkyl sulfonic acids and alkali metal and ammonium salts thereof, alkali metal C8 to C18 alkyl sulfates, and mixtures thereof, in a concentration range of from 0.02 to 5 wt./wt.% of the solution; and
 - iv) the remainder to 100 wt./wt.% water.
2. A solution according to claim 1 wherein the pH is from 1 to 3.
3. A solution according to claim 2 wherein the solution has a hydrogen peroxide concentration of from 0.05 to 8.0 wt./wt.% of the solution.
4. A solution according to claim 3 wherein the solution has a hydrogen peroxide concentration of from 0.05 to 1.0 wt./wt.% of the solution.
5. A solution according to claim 2 wherein the phosphorus-based acid is selected from the group consisting of phosphoric acid, phosphonic acids having 1 to 5 phosphonic acid groups, and mixtures thereof.
6. A solution according to claim 5 wherein the phosphorus-based acid is selected from the group consisting of phosphoric acid, amino tri(methylene phosphonic acid), 1-hydroxyethylidene-1,1,-diphosphonic acid, diethylenetriaminepenta(methylene phosphonic acid), 2-hydroxyethylimino bis(methylene phosphonic acid), ethylene diamine tetra(methylene phosphonic

acid), and mixtures thereof.

7. A solution according to claim 6 wherein the phosphorus-based acid is selected from the group consisting of phosphoric acid, 1-hydroxyethylidene-1,1,-diphosphonic acid, and mixtures thereof.
8. A solution according to claim 2 containing dodecyl benzene sulfonic acid or an alkali metal salt or ammonium salt thereof.
9. An aqueous disinfecting or sanitizing solution having a pH of from 1 to 7 and consisting essentially of:
 - i) hydrogen peroxide in a concentration of from 0.01 to 20 wt./wt.% of the solution;
 - ii) at least one phosphorus-based acid in a concentration range of from 0.05 to 8.0 wt./wt.% of the solution
 - iii) at least one anionic surfactant selected from the group consisting of C8 to C16 alkyl aryl sulfonic acids and alkali metal and ammonium salts thereof, sulfonated C12 to C22 carboxylic acids and alkali metal and ammonium salts thereof, C8 to C22 alkyl diphenyl oxide sulfonic acids and alkali metal and ammonium salts thereof, naphthalene sulfonic acids and alkali metal and ammonium salts thereof, C8 to C22 alkyl sulfonic acids and alkali metal and ammonium salts thereof, alkali metal C8 to C18 alkyl sulfates, and mixtures thereof, in a concentration range of from 0.02 to 5 wt./wt.% of the solution;
 - iv) up to about 3 wt./wt.% of an additional component selected from the group consisting of emulsifiers, hydrotropes, and mixtures thereof; and
 - v) the remainder to 100 wt./wt.% water.
10. A solution according to claim 9 wherein the pH is from 1 to 3.
11. A solution according to claim 10 wherein the solution has a hydrogen peroxide concentration of from 0.05 to 8.0 wt./wt.% of the solution.
12. A solution according to claim 11 wherein the solution has a hydrogen peroxide concentration of from 0.05 to 1.0 wt./wt.% of the solution.

13. A solution according to claim 10 wherein the phosphorus-based acid is selected from the group consisting of phosphoric acid, phosphonic acids having 1 to 5 phosphonic acid groups, and mixtures thereof.
14. A solution according to claim 13 wherein the phosphorus-based acid is selected from the group consisting of phosphoric acid, amino tri(methylene phosphonic acid), 1-hydroxyethylidene-1,1,-diphosphonic acid, diethylenetriaminepenta(methylene phosphonic acid), 2-hydroxyethylimino bis(methylene phosphonic acid), ethylene diamine tetra(methylene phosphonic acid), and mixtures thereof.
15. A solution according to claim 14 wherein the phosphorus-based acid is selected from the group consisting of phosphoric acid, 1-hydroxyethylidene-1,1,-diphosphonic acid, and mixtures thereof.
16. A solution according to claim 10 containing dodecyl benzene sulfonic acid or an alkali metal salt or ammonium salt thereof.
17. A solution according to claim 10 wherein the emulsifier is a polyoxyethylene surfactant.
18. A solution according to claim 10 wherein the hydrotrope is selected from an alkylated sulfonated diphenyl oxide and an alkylated sulfonated diphenyl oxide salt.
19. A solution according to claim 18 containing a C6 alkylated sulfonated diphenyl oxide disodium salt.
20. An aqueous disinfecting or sanitizing solution having a pH of from 1 to 7 and consisting essentially of:
 - i) hydrogen peroxide in a concentration of from 0.01 to 20 wt./wt.% of the solution;
 - ii) at least one phosphorus-based acid in a concentration range of from 0.05 to 8.0 wt./wt.% of the solution;

- iii) at least one anionic surfactant selected from the group consisting of C8 to C16 alkyl aryl sulfonic acids and alkali metal and ammonium salts thereof, sulfonated C12 to C22 carboxylic acids and alkali metal and ammonium salts thereof, C8 to C22 alkyl diphenyl oxide sulfonic acids and alkali metal and ammonium salts thereof, naphthalene sulfonic acids and alkali metal and ammonium salts thereof, C8 to C22 alkyl sulfonic acids and alkali metal and ammonium salts thereof, alkali metal C8 to C18 alkyl sulfates, and mixtures thereof, in a concentration range of from 0.02 to 5 wt./wt.% of the solution;
- iv) a corrosion inhibitor in a concentration of from 0.05 to 10.0 wt./wt.% of the solution; and
- v) the remainder to 100 wt./wt.% water.

21. A solution according to claim 20 wherein the pH is from 1 to 3.

22. An aqueous disinfecting or sanitizing solution having a pH of from 1 to 7 and consisting essentially of:

- i) hydrogen peroxide in a concentration of from 0.01 to 20 wt./wt.% of the solution;
- ii) at least one phosphorus-based acid in a concentration range of from 0.05 to 8.0 wt./wt.% of the solution;
- iii) at least one anionic surfactant selected from the group consisting of C8 to C16 alkyl aryl sulfonic acids and alkali metal and ammonium salts thereof, sulfonated C12 to C22 carboxylic acids and alkali metal and ammonium salts thereof, C8 to C22 alkyl diphenyl oxide sulfonic acids and alkali metal and ammonium salts thereof, naphthalene sulfonic acids and alkali metal and ammonium salts thereof, C8 to C22 alkyl sulfonic acids and alkali metal and ammonium salts thereof, alkali metal C8 to C18 alkyl sulfates, and mixtures thereof, in a concentration range of from 0.02 to 5 wt./wt.% of the solution;
- iv) from 0.1 to 10 wt./wt.% of an alcohol comprising one to six carbon atoms; and
- v) the remainder to 100 wt./wt.% water.

23. A solution according to claim 22 wherein the pH is from 1 to 3.

24. An aqueous disinfecting or sanitizing solution having a pH of from 1 to 7 and consisting essentially of:
- i) hydrogen peroxide in a concentration of from 0.01 to 20 wt./wt.% of the solution;
 - ii) at least one phosphorus-based acid in a concentration range of from 0.05 to 8.0 wt./wt.% of the solution;
 - iii) at least one anionic surfactant selected from the group consisting of C8 to C16 alkyl aryl sulfonic acids and alkali metal and ammonium salts thereof, sulfonated C12 to C22 carboxylic acids and alkali metal and ammonium salts thereof, C8 to C22 alkyl diphenyl oxide sulfonic acids and alkali metal and ammonium salts thereof, naphthalene sulfonic acids and alkali metal and ammonium salts thereof, C8 to C22 alkyl sulfonic acids and alkali metal and ammonium salts thereof, alkali metal C8 to C18 alkyl sulfates, and mixtures thereof, in a concentration range of from 0.02 to 5 wt./wt.% of the solution;
 - iv) a monocarboxylic acid or polycarboxylic acid in a concentration of from about 0.05 to about 4.0 wt./wt.%; and
 - v) the remainder to 100 wt./wt.% water.
25. A solution according to claim 24 wherein the pH is from 1 to 3.
26. An aqueous disinfecting or sanitizing solution having a pH of from 1 to 7 and consisting essentially of:
- i) hydrogen peroxide in a concentration of from 0.01 to about 20 wt./wt.% of the solution;
 - ii) at least one phosphorus-based acid in a concentration range of from 0.05 to 8.0 wt./wt.% of the solution; and
 - iii) at least one anionic surfactant selected from the group consisting of C8 to C16 alkyl aryl sulfonic acids and alkali metal and ammonium salts thereof, sulfonated C12 to C22 carboxylic acids and alkali metal and ammonium salts thereof, C8 to C22 alkyl diphenyl oxide sulfonic acids and alkali metal and ammonium salts thereof, naphthalene sulfonic acids and alkali metal and ammonium salts thereof, C8 to C22 alkyl sulfonic acids and alkali metal and ammonium salts thereof, alkali metal C8 to C18 alkyl sulfates, and mixtures thereof, in a concentration range of from 0.02 to 5 wt./wt.%

- of the solution;
 - iv) up to about 3 wt./wt.% of an additional component selected from the group consisting of emulsifiers, hydrotropes, and mixtures thereof;
 - v) a corrosion inhibitor in a concentration of from 0.05 to 10.0 wt./wt.% of the solution; and
 - vi) the remainder to 100 wt./wt.% water.
27. A solution according to claim 26 wherein the pH is from 1 to 3.
28. An aqueous disinfecting or sanitizing solution having a pH of from 1 to 7 and consisting essentially of:
- i) hydrogen peroxide in a concentration of from 0.01 to about 20 wt./wt.% of the solution;
 - ii) at least one phosphorus-based acid in a concentration range of from 0.05 to 8.0 wt./wt.% of the solution; and
 - iii) at least one anionic surfactant selected from the group consisting of C8 to C16 alkyl aryl sulfonic acids and alkali metal and ammonium salts thereof, sulfonated C12 to C22 carboxylic acids and alkali metal and ammonium salts thereof, C8 to C22 alkyl diphenyl oxide sulfonic acids and alkali metal and ammonium salts thereof, naphthalene sulfonic acids and alkali metal and ammonium salts thereof, C8 to C22 alkyl sulfonic acids and alkali metal and ammonium salts thereof, alkali metal C8 to C18 alkyl sulfates, and mixtures thereof, in a concentration range of from 0.02 to 5 wt./wt.% of the solution;
 - iv) up to about 3 wt./wt.% of an additional component selected from the group consisting of emulsifiers, hydrotropes, and mixtures thereof;
 - v) a monocarboxylic acid or polycarboxylic acid in a concentration of from about 0.05 to about 4.0 wt./wt.%;
 - vi) the remainder to 100 wt./wt.% water.
29. A solution according to claim 28 wherein said pH is from 1 to 3.
30. An aqueous disinfecting or sanitizing solution having a pH of from 1 to 7 and consisting essentially of:

- i) hydrogen peroxide in a concentration of from 0.01 to about 20 wt./wt.% of the solution;
 - ii) at least one phosphorus-based acid in a concentration range of from 0.05 to 8.0 wt./wt.% of the solution; and
 - iii) at least one anionic surfactant selected from the group consisting of C8 to C16 alkyl aryl sulfonic acids and alkali metal and ammonium salts thereof, sulfonated C12 to C22 carboxylic acids and alkali metal and ammonium salts thereof, C8 to C22 alkyl diphenyl oxide sulfonic acids and alkali metal and ammonium salts thereof, naphthalene sulfonic acids and alkali metal and ammonium salts thereof, C8 to C22 alkyl sulfonic acids and alkali metal and ammonium salts thereof, alkali metal C8 to C18 alkyl sulfates, and mixtures thereof, in a concentration range of from 0.02 to 5 wt./wt.% of the solution;
 - iv) up to about 3 wt./wt.% of an additional component selected from the group consisting of emulsifiers, hydrotropes, and mixtures thereof;
 - v) a corrosion inhibitor in a concentration of from 0.05 to 10.0 wt./wt.% of the solution;
 - vi) a monocarboxylic acid or polycarboxylic acid in a concentration of from about 0.05 to about 4.0 wt./wt.%; and
 - vii) the remainder to 100 wt./wt.% water.
31. A solution according to claim 30 wherein the pH is from 1 to 3.
32. An aqueous disinfecting or sanitizing solution having a pH of from 1 to 7 and comprising:
- i) hydrogen peroxide in a concentration of from 0.01 to 20 wt./wt.% of the solution;
 - ii) at least one phosphorus-based acid in a concentration range of from 0.05 to 8.0 wt./wt.% of the solution;
 - iii) at least one anionic surfactant selected from the group consisting of C8 to C16 alkyl aryl sulfonic acids and alkali metal and ammonium salts thereof, sulfonated C12 to C22 carboxylic acids and alkali metal and ammonium salts thereof, C8 to C22 alkyl diphenyl oxide sulfonic acids and alkali metal and ammonium salts thereof, naphthalene sulfonic acids and alkali metal and ammonium salts thereof, C8 to C22 alkyl sulfonic acids and alkali

metal and ammonium salts thereof, alkali metal C8 to C18 alkyl sulfates, and mixtures thereof, in a concentration range of from 0.02 to 5 wt./wt.% of the solution; and

iv) a hydrotrope selected from an alkylated sulfonated diphenyl oxide and an alkylated sulfonated diphenyl oxide salt.

33. A solution according to claim 32 wherein the pH is from 1 to 3.
34. A solution according to claim 33 wherein said hydrotrope is a C6 alkylated sulfonated diphenyl oxide disodium salt.
35. A solution according to claim 33 wherein the phosphorus-based acid is selected from the group consisting of phosphoric acid, phosphonic acids having 1 to 5 phosphonic acid groups, and mixtures thereof.
36. A solution according to claim 35 wherein the phosphorus-based acid is selected from the group consisting of phosphoric acid, amino tri(methylene phosphonic acid), 1-hydroxyethylidene-1,1,-diphosphonic acid, diethylenetriaminepenta(methylene phosphonic acid), 2-hydroxyethylimino bis(methylene phosphonic acid), ethylene diamine tetra(methylene phosphonic acid), and mixtures thereof.
37. A solution according to claim 36 wherein the phosphorus-based acid is selected from the group consisting of phosphoric acid, 1-hydroxyethylidene-1,1,-diphosphonic acid, and mixtures thereof.
38. A solution according to claim 33 containing dodecyl benzene sulfonic acid or an alkali metal salt or ammonium salt thereof.
39. A solution according to claim 33 further comprising an emulsifier.
40. A solution according to claim 39 wherein the emulsifier is a polyoxyethylene surfactant.
41. A solution according to claim 33 wherein the solution has a hydrogen peroxide concentration of from 0.05 to 8.0 wt./wt.% of the solution.

42. A solution according to claim 41 wherein the solution has a hydrogen peroxide concentration of from 0.05 to 1.0 wt./wt.% of the solution.
43. A solution according to claim 33 containing a corrosion inhibitor in a concentration of from 0.05 to 10.0 wt./wt.% of the solution.
44. A solution according to claim 33 containing from 0.1 to 10 wt./wt.% of an alcohol comprising one to six carbon atoms.
45. A solution according to claim 33 containing a monocarboxylic acid or polycarboxylic acid in a concentration of from about 0.05 to about 4.0 wt./wt.%.